

IN THE CLAIMS

Please amend the claims as follows:

1. (Currently amended) A tube fitting assembly assembled with a metal tube, comprising:

a) a metal tube having a tube end;

b) a fitting comprising a body and nut that can be joined; said body having an interior bore that receives the metal tube end along a central-longitudinal axis of the fitting; said bore having a camming surface at one-a first end of said bore and a generally radial shoulder facing the tube end at a second end of said bore;

c) said nut having a ferrule drive surface; and

d) a ferrule having a front end and a back end; said ferrule back end being radially spaced from the tube end and having a ferrule driven surface engaging said nut ferrule drive surface when the fitting is pulled up; said ferrule front end engaging said camming surface to form a seal; said ferrule having a central bore formed by a cylindrical interior wall closely received over the tube end during assembly; said ferrule front end including a front edge that indents into the tube end, said cylindrical interior wall including a portion that deforms to form a convex portion in a longitudinal section that is axially spaced from said ferrule front edge; wherein said ferrule radially compresses against said tube end with a compressive stress that decreases in a generally axial direction away from said front edge along the entire length of said interior wall;

e) wherein said camming surface forms an included angle of about thirty-five degrees to about sixty degrees with respect to said longitudinal axis.

2. (Currently amended) The fitting assembly of claim 1 wherein said ferrule front end engages said camming surface to form a metal to metal primary seal.

3. (Canceled).

4. (Currently amended) The fitting assembly of claim 1 wherein said ferrule front end forms a line contact seal against said camming surface.

5. (Currently amended) The fitting assembly of claim 1 wherein said ferrule driven surface is convex.

6-7. (Canceled).

8. (Currently amended) The fitting assembly of claim 1 wherein said ferrule back end is radially spaced from the tube end after a completed initial pull-up of the fitting.

9-10. (Canceled).

11. (Currently amended) The fitting assembly of claim 1 wherein said ferrule comprises an outer wall having a concavity that facilitates radial compression of said ferrule against the tube end.

12-13. (Canceled).

14. (Currently amended) The fitting assembly of claim 1 wherein said ferrule driven surface engages said ferrule drive surface of said nut at a difference angle therebetween so that said ferrule back end is radially spaced from the tube end after a complete pull-up.

15. (Canceled).

16. (Currently amended) The fitting assembly of claim 1 wherein the tube end is at least .5 inch diameter.

17. (Currently amended) The fitting assembly of claim 1 wherein said included angle is about forty degrees to about fifty degrees.

18. (Currently amended) The fitting assembly of claim 17 wherein said included angle is about forty-five degrees.

19. (Canceled).

20. (Currently amended) The fitting assembly of claim 5 wherein said convex driven surface contacts said nut ferrule drive surface at a location that is radially spaced from the tube end.

21. (Canceled).

22. (Currently amended) The fitting assembly of claim 20 wherein said convex driven surface comprises a radius portion.

23. (Currently amended) The fitting assembly of claim 22 wherein said convex driven surface further comprises a straight portion.

24. (Currently amended) The fitting assembly of claim 11 wherein said outer wall concavity is formed by an axially tapered portion and a generally cylindrical portion of said outer wall.

25-27. (Canceled).

28. (Currently amended) A tube fitting assembly assembled with a metal tube comprising:

- a metal tube with a tube end;
- a fitting comprising a body and a nut that can be joined; said body having an interior bore that receives the metal tube end along a central longitudinal axis of the fitting; said bore having a camming surface at one-a first end of said bore and a generally radial shoulder facing the tube end at a second end of said bore;

- said nut having a ferrule drive surface; and
- a single ferrule having a front end and a back end; said ferrule back end being radially spaced from the tube end and having a ferrule driven surface engaging said nut ferrule drive surface when the fitting is pulled up; said ferrule front end engaging said camming surface

to form a seal; said ferrule having a central bore formed by a continuous cylindrical interior wall closely received over the tube end during assembly;

e) said ferrule front end including a front edge that indents into the tube end, wherein said continuous cylindrical interior wall deforms to form a convex portion in a longitudinal section ~~that is axially spaced from said ferrule front edge~~;

f) wherein said camming surface forms an included angle of about thirty-five degrees to about sixty degrees with respect to said longitudinal axis.

29-31. (Canceled).

32. (Currently amended) The fitting assembly claim 28 wherein said ferrule comprises an outer wall having a concavity that facilitates said radial compression of said cylindrical interior wall.

33-35. (Canceled).

36. (Currently amended) The fitting assembly of claim 28 wherein said camming surface is about forty degrees to about fifty degrees and said driven surface is convex.

37. (Canceled).

38. (Currently amended) The fitting assembly of claim 28 wherein said ferrule back end comprises an interior counterbore.

39-41. (Canceled).

42. (Currently amended) The fitting assembly of claim 28 wherein said ferrule comprises an axially tapered outer wall.

43-44. (Canceled).

45. (Withdrawn) The tube fitting of claim 44 wherein said threaded connection comprises buttress threads.

46. (Withdrawn) The tube fitting of claim 44 wherein said threaded connection comprises acme threads.

47. (Currently amended) The fitting assembly of claim 28 wherein said ferrule driven surface and said nut ferrule drive surface form a difference angle therebetween when said surfaces initially meet during assembly of the fitting.

48. (Currently amended) The fitting assembly of claim 47 wherein said difference angle is such that said drive surface contacts said driven surface at a location that is radially spaced from the tube end.

49. (Withdrawn) The fitting assembly of claim 28 wherein said interior bore forms an angle α with the surface of the tube end, said angle being about three to about five degrees from normal.

50. (Withdrawn) In a flareless tube fitting of the type having a first fitting component threadably joinable to a second fitting component, with at least one ferrule contained within a cavity defined by the joined components, the improvement comprising said threaded connection having buttress threads.

51. (Withdrawn) In a flareless tube fitting of the type having a first fitting component threadably joinable to a second fitting component, with at least one ferrule contained within a cavity defined by the joined components, the improvement comprising said threaded connection having acme threads.

52. (Canceled).

53. (Withdrawn) A tube fitting for metal tubing, comprising:

a first fitting component and a second fitting component that can be joined together along a central axis of the fitting; said first and second fitting components being made of metal;

said first fitting component comprising a bore that slideably receives a tube end and a tapered camming surface at one end of said bore;

said second fitting component having a tube gripping device that is integrally attached thereto and that engages said camming surface when the fitting is made up.

54. (Withdrawn) The tube fitting of claim 53 wherein said tube gripping device extends in a cantilevered manner from a portion of said second fitting component.

55. (Withdrawn) The tube fitting of claim 53 wherein said first and second components comprise stainless steel.

56. (Withdrawn) A metal fitting component for a flareless metal tube fitting, comprising:

a main metallic body having a central bore therein; and

a metallic tube gripping device that is integrally attached to said main body and extends into said central bore.

57. (Withdrawn) The tube fitting of claim 55 wherein said tube gripping device extends in a cantilevered manner from a portion of said main body.

58. (Withdrawn) The tube fitting of claim 56 wherein said tube gripping device functions as a ferrule.

59. (Canceled).

60. (Currently amended) The fitting assembly of claim 1 wherein said cylindrical interior wall comprises a circumferential radial recess.

61. (Canceled).

62. (Currently amended) The fitting assembly of claim 1 wherein the metal tube is a stainless steel tube.

63. (Currently amended) The fitting assembly of claim 28 wherein the tube is a stainless steel tube.

64-65. (Canceled).

66. (Currently amended) The fitting assembly of claim 28 wherein said included angle is about forty-five degrees.

67. (New) A tube fitting assembly, comprising:

- a) a metal tube having a tube end;
- b) a fitting component having an interior bore that receives the metal tube end along a longitudinal axis of the fitting; said bore having a camming surface at a first end of said bore and a generally radial surface facing the tube end at a second end of said bore; and
- c) a ferrule having a front end and a back end, said ferrule front end engages said camming surface to form a seal and said ferrule back end is radially spaced from the tube end when the fitting is pulled up; said ferrule having a central bore formed by a cylindrical interior wall closely received over the tube end during assembly; said ferrule front end including a front edge that indents into the tube end; said cylindrical interior wall including a portion that deforms to form a convex portion in a longitudinal section; wherein said ferrule radially compresses against said tube end with a compressive stress that decreases in a generally axial direction away from said front edge along the entire length of said interior wall;
- d) wherein said camming surface forms an included angle of about thirty-five degrees to about sixty degrees with respect to said longitudinal axis.

68. (New) The fitting assembly of claim 67 wherein the metal tube is a stainless steel tube.

69. (New) The fitting assembly of claim 67 wherein said included angle is about forty-five degrees.

70. (New) The fitting assembly of claim 67 wherein said ferrule has a continuous cylindrical interior wall.

71. (New) The fitting assembly of claim 67 wherein said ferrule front end engages said camming surface to form a metal to metal primary seal.

72. (New) The fitting assembly of claim 67 wherein said ferrule front end forms a line contact seal against said camming surface.

73. (New) The fitting assembly of claim 67 wherein said ferrule has a back end having a convex driven surface.

74. (New) The fitting assembly of claim 73 wherein said convex driven surface comprises a radius portion.

75. (New) The fitting assembly of claim 73 wherein said convex driven surface further comprises a straight portion.

76. (New) The fitting assembly of claim 67 wherein said ferrule comprises an outer wall having a concavity that facilitates radial compression of said ferrule against the tube end.

77. (New) The fitting assembly of claim 76 wherein said outer wall concavity is formed by an axially tapered portion and a generally cylindrical portion of said outer wall.

78. (New) A tube fitting assembly comprising:

- a) a metal tube with a tube end;
- b) a fitting component having an interior bore that receives the metal tube end along a central longitudinal axis of the fitting; said bore having a camming surface at a first end of said bore and a generally radial surface facing the tube end at a second end of said bore; and
- d) a single ferrule having a front end and a back end, said front end engages said camming surface to form a seal and said back end is radially spaced from the tube end when the fitting assembly is pulled up; said ferrule having a central bore formed by a continuous cylindrical interior wall closely received over the tube end during assembly;
- e) said ferrule front end including a front edge that indents into the tube end, wherein said continuous cylindrical interior wall deforms to form a convex portion in a longitudinal section;
- f) wherein said camming surface forms an included angle of about thirty-five degrees to about sixty degrees with respect to said longitudinal axis.

79. (New) The fitting assembly of claim 78 wherein the metal tube is a stainless steel tube.

80. (New) The fitting assembly of claim 78 wherein said included angle is about forty-five degrees.

81. (New) The fitting assembly of claim 78 wherein said ferrule front end engages said camming surface to form a metal to metal primary seal.

82. (New) The fitting assembly of claim 78 wherein said ferrule front end forms a line contact seal against said camming surface.

83. (New) The fitting assembly of claim 78 wherein said ferrule has a back end having a convex driven surface.

84. (New) The fitting assembly of claim 83 wherein said convex driven surface comprises a radius portion.

85. (New) The fitting assembly of claim 83 wherein said convex driven surface further comprises a straight portion.

86. (New) The fitting assembly of claim 78 wherein said ferrule comprises an outer wall having a concavity that facilitates radial compression of said ferrule against the tube end.

87. (New) The fitting assembly of claim 86 wherein said outer wall concavity is formed by an axially tapered portion and a generally cylindrical portion of said outer wall.

88. (New) The fitting assembly of claim 86 wherein said outer wall concavity is formed by an axially tapered portion and a generally cylindrical portion of said outer wall.

89. (New) The fitting assembly of claim 1 wherein said ferrule has a ratio of about 3.3 times the hardness of the tube end.

90. (New) The fitting assembly of claim 28 wherein said ferrule has a ratio of about 3.3 times the hardness of the tube end.